AUSTRALIAN BROADCASTING CORPORATION

DELIVERY SPECIFICATIONS

FOR STANDARD DEFINITION AND HIGH DEFINITION

PROGRAMS ON DIGITAL VIDEOTAPE

INTRODUCTION

These guidelines are designed to allow a supplier to make a videotape copy of a program that conforms to the on-air technical operational requirements of the Australian Broadcasting Corporation (ABC). They have been formulated by ABC Broadcast Operations, Post Production and the Technology & Distribution Groups.

These guidelines encompass the delivery of both SDTV programs on Digital Betacam and HDTV programs on HDCAM format with multi-channel audio. The document also elaborates on the format and caption needs of material supplied to the ABC.

The chosen tape formats are the current transmission standard for all on-air material for the ABC Network, both for programs and interstitials. This document is designed to provide consistent standards from our external suppliers as well as a guide for our internally produced material.

This document is not meant to hamper program creators; it is intended, as a document to clarify the program material needs of the ABC.

The following specifications are based on current and commonly accepted standards. The ABC thanks the BBC, Free TV Australia (Federation of Australian Commercial Television Stations), SMPTE, EBU, ITU, Dolby Laboratories and the Sony Corporation.

This guide is intended as a "living" document and will be reviewed from time-to-time to keep it current with agreed industry standards.

The Australian Broadcasting Corporation, unlike its commercial counterparts, rarely has a need to dub the supplied material prior to transmission. As a result, program tapes supplied, after undergoing an acceptance check, are aired back-to-back with other supplied tapes under total automation control and without the opportunity of individual readjustment of video and audio etc. Whilst this places a degree of adherence to 'tight' standards, it provides the program maker with the firm assurance that their program is transmitted on-air in a "one-to-one" environment.

1 GENERAL

1.1 Every program submitted for ABC transmission must pass a technical check carried out on ABC equipment by qualified staff, to ensure that it meets ABC requirements. Any programs not meeting this requirement may be returned to the internal or external supplier for correction. A subsequent review will be performed to check that these requirements are met.

1.2 Videocassettes shall be protected by suitable packaging and be delivered in the manufacturer's plastic purpose designed cases. The videocassette and case shall be clearly labelled to match the supplied program.

1.3 The videocassette label shall be a single layer of label located in the recessed area on the face of the cassette. No other labels shall be affixed outside this recessed area.

1.4 The videocassette's spine is to be left clear for the ABC's own requirements.

1.5 Tapes shall be of the highest professional quality and shall not cause the channel indicators on the videotape machines to deviate from green, to either amber or red during the program.

1.6 All programs with a duration between 10 and 120 minutes shall be delivered on a single cassette. A number of short programs may be supplied on the same videocassette. If this is done, then each program shall have its own slate and clock. At least 30 seconds of black and silence shall follow each program, and each program shall start on a whole or half minute of time-code. All the programs on a single videocassette shall have the same aspect ratio.

1.7 If a program is supplied with breaks, then elements to aid editing (textless titles/credits, clean breaker play-outs), shall be provided as separate items following the program parts, if these elements are available.

1.8 The beginning of each tape shall have:

a) Colour Bars. Whilst the ABC standard is 100% colour bars for a minimum duration of 1 minute and a maximum of two minutes, EBU bars will be accepted from external suppliers.

b) Identification. The start of program shall be preceded by an ident that shall show the Program Title, subtitle with episode number and audio mode and, where appropriate the program number and version suffix.

c) Countdown. The program shall be preceded by at least 10 seconds of countdown that goes to black at 2 seconds. It is preferable that the program duration be included on the countdown.

The above is also referred to in sections 2, 6, and 12.

1.9 Overall program duration must be in whole seconds (HH:MM:SS).

2 VIDEO REQUIREMENTS

2.1 COMMON

2.1.1 100% colour bars shall be recorded at the start of each tape for at least a minimum duration of 1 minute and a maximum of two minutes. The colour bars must be digitally generated. EBU bars will be accepted from external suppliers.

2.1.2 The line-up colour bar test signal shall replay at correct luminance level, black level, chroma level and chroma phase, with the VTR manufacturer's TBC settings in 'preset'.

2.1.3 Program video levels shall be consistent with line-up video levels.

2.1.4 Maximum video levels of program material with reference to line-up signals shall be 700 mV plus an operational tolerance of + 28mV (up to 104%) for luminance (Y), and 700mV for each colour difference signal (Cr, Cb). Whatever the combination of luminance and chrominance components the signal shall not produce an R.G.B. or PAL encoded gamut error when measured by an appropriate instrument (such as a digital waveform monitor). Black level shall not extend below blanking level (0mV luminance).

2.2 STANDARD DEFINITION

A SDTV videotape recording shall additionally conform to the following specifications:

2.2.1 The Supplier shall deliver the product as a Standard Definition Television (SDTV) videotape recording in the Digital Betacam Format. The video tape recording shall be 625 lines at 25 frames per second and interlaced 2:1 (576/50i). This shall be in agreement with the specifications of Recommendation ITU-R BT. 601-5, SMPTE 259M (as revised).

2.2.2 Where possible the supplied SDTV tape shall be one (or less) generation removed from the original master video product, and shall preferably be generated by dubbing the material via a Serial Digital Interface (SDI) pathway, ensuring minimum loss of quality during the transfer (assuming an SDTV master).

2.2.3 All SDTV programs produced using modern digital equipment shall have narrow horizontal blanking, ie. active vision shall be 720 horizontal pixels wide. Legacy programs with 702 pixel wide vision (wide horizontal blanking) will also be acceptable. A single program shall have consistent blanking throughout.

2.2.4 All SDTV widescreen programs shall have 720 pixels x 576 lines active picture area.

2.2.5 All rollers and moving captions shall be free of judder and blur.

2.3 HIGH DEFINITION

A HDTV videotape recording shall additionally conform to the following specifications:

2.3.1 The supplier shall deliver the product as a High Definition Television (HDTV) videotape recording in HDCAM SR, or HDCAM (D.11) format. The video tape recording shall be 1080 active lines at 25 frames per second 2:1 interlaced format. (1080/50i or 1080/25PsF). This shall be in agreement with the specifications of Recommendation ITU-R BT. 709-5, SMPTE 292M (as revised).

2.3.2 The product shall be of the highest quality and shall be suitable for HDTV television broadcast without further processing of picture or sound. The supplied HDTV image shall be suitable for down conversion and SDTV broadcast (as 16:9). The judgement of the suitability of the program for this purpose will be at the sole discretion of the ABC.

2.3.3 The HDTV videotape recording shall be one generation (or less) removed from the original master video product.

2.3.4 To qualify a program as HD, the majority of footage shall be acquired using Professional Broadcast HD cameras or 35mm film. If HDV acquisition is used, then the camera shall be from a manufacturers 'Professional' range, but in any case shall not qualify towards the majority needed.

2.3.5 If a HD program is sourced from a full resolution HD file, HDCAM SR or D5, the supplied videotape shall be a first generation copy, supplied on a HDCAM SR videotape.

2.3.6 If a HD program is sourced from a HDCAM videotape, a HDCAM videotape will be acceptable.

2.3.7   All rollers and moving captions shall be free of judder or blur. It is recommended that these elements shall have been created in 1080/50i, to meet this standard.

2.3.8   All HD programs shall have 1920 pixels x 1080 lines active picture area.

2.3.9   Where 'film look' is required, then progressive capture is the preferred method. Simple field duplication is not acceptable.

3 ASPECT RATIOS

3.1   Both SDTV and HDTV programs shall be delivered as a 16:9 scan format unless the program is a legacy 4:3 program.

3.1.1   A legacy 4:3 SDTV program shall be delivered as 4:3 full height, (on a 4:3 scan format).

3.1.2   A legacy 4:3 HDTV program shall be delivered as a 4:3 pillar-box (on a 16:9 scan format).

3.2   All programs of a series shall be supplied in the same aspect ratio.

3.3   The aspect ratio of the image shall be 16 units horizontally by 9 units vertically (i.e. 16:9 aspect ratio). The picture displayed shall have correct geometry and occupy full frame width, and height.

3.4   There shall be a centre '14:9 protected area'. This shall allow simultaneous compatible transmission on the ABC's existing analogue 4:3 network. This 'safe protected portion' shall be centred on the original image, both horizontally and vertically. All relevant title content shall fall within the appropriate '14:9 safe title' area, as described in the applicable 'Safe Area' diagram. 'Protection Guidelines' can be found in Section 14 of this document.

3.5   If the supplier cannot guarantee their program is 14:9 safe, then special agreement will need to be obtained from the ABC.

3.5.1   In any case, a SD program will need to meet the '16:9 Protection Guidelines' shown in Section 14.

3.5.2   An HD program when down-converted with no geometry change, shall also meet the SD '16:9 Protection Guidelines'.

3.6   Aspect ratios (of images) within a program shall be consistent. Content shall appear with a natural width to height relationship. All 4:3 footage shall be conformed to integrate into a 16:9 program. This shall, preferably, be achieved by way of a blow-up and pan/scan to16:9 Full Height. If 4:3 footage cannot be conformed by way of a blow-up and pan/scan to 16:9 Full Height, production shall seek clarification and/or dispensation from Head of ABC TV Programming or nominee.

3.7   Letterbox formats on a 4:3 scan shall not be accepted.

3.8   If a program has a higher ratio than 16:9, (eg. 21:9) then that program shall be delivered as a letterbox 16:9 program. A 21:9 letterbox on a 4:3 scan is not acceptable.

4 SUBJECTIVE VIDEO QUALITY

4.1   Colour rendition, especially skin tones, shall be natural unless artistic considerations require otherwise.

4.2   Picture black level shall be appear to be correct, free of noticeable crushing, compression or clipped dark area.

4.3   Low lit scenes shall have sufficient contrast and APL (average picture level), to appear acceptable under normal viewing conditions.

4.4   Picture white area where detail is required, shall appear normal and free of noticeable highlight compression (flattening).

4.5   Transient response shall be crisp and clean, free of noticeable horizontal or vertical pre-shoot, ringing, overshoot, smear, echoes (ghosts) and afterglow effects.

4.6   Moire and pattern beating/artefacts shall not be visible.

4.7   The introduction of special visual effects must not introduce unintentional changes to luminance or chrominance, nor perceptible timing shifts, or lip sync errors.

4.8   Program material shall be free of head-switching, digital blocking, dirt, aliasing, dropouts, artefacts due to equipment faults etc. This applies to the whole active picture area.

4.9   Programs shall have full vertical resolution. Simple 'drop/repeat' field techniques shall not be used.

4.10   Active picture area shall be free of any Vertical Interval Test Signals (VITS), Vertical Interval Time Code (VITC), Wide Screen Signalling (WSS), or any other visible signalling data.

5 STANDARDS CONVERSION

5.1   All product sourced as electronically originated material from 59.94i/60i video sources shall be supplied via a high quality 'Motion Vector Compensated' standards conversion system. The object of this requirement is the elimination of temporal (motion) artefacts.

5.2   If a program is originated as 24fps/25fps film, but post produced in the 59.94i/60i electronic domain, the supplied videotape shall be Standards Converted by equipment that removes repeated fields.

5.3   HD product produced as 24p, shall be 'converted' to 1080/50i by a 4% speed change (with audio pitch correction), thus retaining full resolution and frame relationship.

5.4   If the program is a complete film originated product, then the supplied videotape shall be a true SD 576/50i or HD 1080/25PsF/50i transfer of that film product – in other words not a standards conversion.

5.5   Camera cuts shall be 'clean' and free of partial mixing from adjacent frames.

5.6   Text, especially rollers and crawls, shall be easily readable after conversion, and free of interpolation errors.

6 NORMAL AUDIO REQUIREMENTS

The normal audio format (also known as PCM) shall conform to the following specifications:

6.1   The ABC audio reference standard is –20 dBFS. Recordings made in the EBU standard of –18 dBFS will also be accepted. The –20 dBFS level is also referred to as 0 VU or as Level 4 on an IEC Type IIa (BBC) scale.

6.2   At least one minute (maximum of two minutes) of tone at line-up level (1kHz at –20dBFS) shall accompany the line-up colour bars. Tone during line up is to be on each track carrying program sound.

6.3   Reference tone (at –20dBFS or EBU –18dBFS) shall replay at the correct level using the VTR manufacturer's 'preset' audio level positions. Tone should be recorded from a common source in phase to allow stereo phase checks to be performed. This tone is to be interrupted on one channel every few seconds for identification and be clearly identified whether it is left or right channel.

6.4   The level of audio on tracks 1/2 shall normally not exceed -12dBFs (6PPM on an IEC Type IIa (BBC) scale meter) and should never be above -8 dBFs (7PPM).

6.5   Apparent loudness should be consistent throughout the entire program. As a general rule, foreground dialogue or commentary elements should have an average level that is consistent relative to the reference level established. This should be appraised with a suitable metering instrument, and intelligent interpretation appropriate for the type of instrument used. The outcome of this requirement is that a listener listening with low volume settings should not feel the need to readjust their listening volume throughout a program, due to excessively high or low loudness.

6.6   The minimum audio requirement shall be stereo (or dual mono) or Dolby Surround, or a Dolby Pro-Logic II encoded stereo pair with centre and surround information encoded into the Lt/Rt signals.

6.7   In the event that the program is mono, then audio tracks 1/2 shall carry mono audio. These tracks shall have identical phase

6.8   The videotape machine audio track assignment shall be:

Track 1 Stereo Left or Lt or Dual Mono.
Track 2 Stereo Right or Rt or Dual Mono.
Track 3 Stereo Left M/E, or Dolby E stream (where applicable).
Track 4 Stereo Right M/E or Dolby E stream (where applicable).

6.9 Program audio shall not commence until 12 frames after start of program (program may start in black) and shall end a minimum of 12 frames prior to end of a program. (This is due to ABC transmission automation requirements).

6.10 The videotape shall not require audio noise reduction processing, nor be recorded with digital emphasis.

6.11 Lip synchronization shall appear correct.

7 DOLBY E AUDIO REQUIREMENTS

Audio encoded within a Dolby E stream shall conform to the following specifications:

7.1 The ABC audio reference standard is –20 dBFS.

7.2 Reference tone (at –20dBFS or EBU –18dBFS) recorded within a Dolby E stream shall replay at the correct levels, after decoding the Dolby E stream.

7.3 At least one minute (maximum of two minutes) of tone at line-up level shall be recorded, encoded as Dolby E for level confirmation.

7.4 All audio tracks within a Dolby E stream shall not exceed an instantaneous peak of -8dBFS. If these audio levels are met, (within a Dolby E stream) then the correct Dialnorm value for that multi-channel mix should fall between –31 and –21. Audio mixes such as those made for DVD music mastering are often unacceptable.

7.5 Apparent loudness should be appraised using intelligent interpretation of appropriate loudness metering equipment. As a general rule, the conversational dialogue or commentary content of the program should on average be consistent with the established dialogue normal level (dialnorm) throughout the program. The result should be that a listener shall not feel the need to readjust the audio listening volume due to excessively high or low loudness.

7.6 To calculate the correct apparent loudness when producing a multi-channel surround mix, a Dolby DP-570 Multichannel Audio Tool, DP-600 program optimizer or LM-100 Broadcast Loudness Meter Unit should be used to help determine the correct Dialnorm metadata value.

7.7 Correct synchronisation (lip) between the video, audio tracks 1/2, Music and Effects, and decoded audio from the Dolby E stream shall be maintained at all times.

7.8 If a program is Dolby E encoded then the Dolby E stream shall be recorded on tracks 3 & 4. Tracks 1 & 2 must still carry the normal stereo (or Lt/Rt) mix.

7.9 Dolby E shall only be used if there is a requirement for a multi-channel surround mix.

7.10 The track assignment of the Dolby E stream shall conform to SMPTE 320M as follows:

Track 1 Left
Track 2 Right
Track 3 Centre
Track 4 LFE
Track 5 Left Surround
Track 6 Right Surround
Track 7 Lt or freely assigned
Track 8 Rt or freely assigned

7.11 Track identification (during line up test signals) within the Dolby E stream is preferred, but not mandatory if conformed to SMPTE 320M.

7.12 The ABC's requirement is for the Dolby E stream to be 'one frame advanced on tape'. A consequence is that when the Dolby E is encoded, the multi track audio source will need to be advanced 2 frames.

7.13 All multi-channel audio shall be 'down-mix' compatible. Thus if a 5.1 Dolby program is played via a small mono speaker, or stereo system, the dialogue will still be easy to comprehend and not 'drowned' out.

7.14 In the event that a Dolby E audio stream is provided, the minimum Metadata to be included in the Dolby E stream shall be:

DIALNORM: This value (and other parameters) shall meet the Dolby recommended standard as set out in the 'Dolby Metadata Guide'. In practice this value should fall between –31 and –21 (of the possible –1 to –31) to allow voice overs during presentation.

DYNAMIC RANGE CONTROL: This metadata can be applied by the receiving decoder to reduce the transmitted signal dynamic range. Again see the 'Dolby Metadata Guide'.

AUDIO PROGRAM MODES: This describes 'how many audio channels are present'. 2/0 for stereo, Lt/Rt for Dolby surround, 3/2L for a 5.1 program and 3/2L+2 for a 5.1 plus freely assigned audio on tracks 7/8. Refer to the Dolby DP-569 Multichannel Dolby Digital Encoder or DP-570 Multichannel Audio Tool manual.

7.15 The above Metadata shall control 'audio program one' within the Dolby encoding system. This is the audio program that will be used for transmission.

7.16 The ABC reserves the right to edit and re-author the metadata for program presentation purposes.

The Australian Broadcasting Corporation and the authors of these specifications, acknowledge that it is not possible to formulate pure technical parameters for 'apparent loudness'. We can however provide the following guidelines.

For normal stereo programs we would recommend that the specifications in section 6 (Normal Audio Requirements) be followed, however we would not recommend excessive use of limiting and/or compression, in order to force the program to meet this requirement, This can result in audio levels being at the 'maximum' level, with excessive and unnatural apparent loudness. A small amount of limiting/compression is acceptable.

Within a Dolby 5.1 mix, individual track levels must follow the specifications in section 7 (Dolby E Audio Requirements). Again the same recommendations apply about limiting/compression as a stereo program. Then if the correct 'Dialnorm' value is applied (as per Dolby recommendations) the apparent loudness should be fine. Application of the correct 'Dialnorm' value to a music 5.1 mix requires a greater degree of intelligent appraisal and interpretation, based on the characteristics of the particular music program. It is still necessary that individual tracks meet the same levels as set out in section 7. If these requirements are not observed and the de-coded 5.1 music tracks have levels substantially above reference level, then it becomes impossible for the ABC to correctly integrate voice overs and other presentation elements, during automated playout.

8 SUBJECTIVE AUDIO QUALITY

8.1   Overall sound quality shall be pleasing and free of noticeable noise or spurious signals (eg. Hum, buzz, distortion, wow, flutter, or excessive sibilance).

8.2   Microphone placement shall have ensured that the effect of location acoustics, and environmental noise are minimal.

8.3   Tonal balance, bass to mid range to treble, shall be pleasing and natural.

8.4   Sound shall have been appropriately captured so that all programs shall maintain correct spatial relationship between pictures and sound, for both stereo and multi-channel audio.

8.5   All audio channels shall be in phase from beginning to end unless artistic considerations require otherwise. The program should generally remain 'in-phase' to provide mono compatibility.

8.6   Use of excessive limiting/compression in order to conform to audio peak level requirements, (ref 6.4, 7.4) should especially be avoided.

8.7   The audio shall be free of excessive limiting/compression (pumping or peak distortion).

8.8   Dynamic range of the audio tracks shall not be excessive. They shall be suitable for a large variety of domestic listening conditions. Upon domestic decoding, the surround sound shall be suitable for a large variety of domestic listening conditions.

9 TIMECODE

The Timecode track shall conform to the following specifications:

9.1   The Longitudinal Timecode (LTC) shall be 25 Hz according to EBU specification Tech.3097 and N12.

9.2   LTC shall be recorded on the timecode track and be frame locked to video.

9.3   Program start shall be at either 00:02:30:00, or 10:00:00:00 timecode.

9.4   The timecode time throughout a tape must always ascend in value.

9.5   A tape's timecode shall not cross the 23.59.59:24 / 00.00.00:00 midnight discontinuity.

9.6   For SDTV, Vertical Interval Timecode (VITC) is preferred on lines 18/331 and 20/333 and to match LTC exactly. Lines before 18/331 shall have no VITC and all other vertical blanking lines to be preferably left blank of VITC.

9.7   For a HDCAM, or HDCAM SR tape the VITC is recorded as auxiliary data. Thus for HDCAM/SR, VITC is not line specific.

9.8   The timecode for a single program and its pre/post roll, shall be continuous and contiguous.

9.9   Specific user-bit settings are not required.

10 CLOSED CAPTIONS

10.1 STANDARD DEFINITION

Closed captions shall conform to the following specifications:

10.1.1 The Australian Closed Captioning standard is for data to be carried on line 21, repeated on line 334 and be viewed/displayed on page 801.

10.1.2 Closed Captioning data shall be continuous and updated on each successive frame.

10.1.3 The nominal luminance level of these signals shall be 490mV peak-to-peak.

10.1.4 A closed captioned program shall have dummy headers present on line 21 and 334 when there is no Closed Caption information to be displayed.

10.1.5 A command to clear any existing captions from a viewer's de-coder shall be included within the first two seconds of a program's start. Similarly a clear command shall be included at least two seconds before the end of a program. The latter ensures that no spurious captions remain after the conclusion of that program.

10.1.6 Closed captions shall be positioned so as to be clear of a program's 'open' text.

10.1.7 Ceefax, which is continuous data on line 21, repeated on line 334, and viewed/displayed on page 801, will also be accepted.

10.2 HIGH DEFINITION

10.2.1 The HDCAM format does not currently support Closed Captioning.

11 OPEN SUBTITLES

11.1. On screen positioning shall be within the 14:9 safe title area for 16:9 programs, and the 4:3 safe title area for legacy 4:3 programs.

11.2. There shall be no more than two lines of text, visible at one time.

11.3. Subtitles shall be easily legible and not outpace viewers.

Recommended display times are:
1 second   1 short word
2 seconds   up to 26 characters
3 seconds   up to 40 characters
4 seconds   up to 52 characters

Recommended face:
Gothic 731 News Gothic Bold.

52 scan lines high per lettering row, with capital letters occupying 32 lines. The remaining 20 scan lines are for descenders and ascenders (such as the tail of the letter 'g' and accents such as Á).

'Colour Bar Yellow' with a black border.

12 IDENTIFICATION

12.1 The videotape cassette and box shall contain a 'program sheet' fully describing the nature of both the picture and sound recordings including as much of the following as possible:

Program supplier or agent.
Name of recording facility house.
Recording date.
Program and/or Series and/or Episode title.
Duration in minutes and seconds, from 'natural' start to end. (not necessarily vision to vision).
Supplier's program number.
Audio track allocation and reference level, including the audio status of dual mono, stereo or Dolby surround.
Presence of Dolby E stream including 'frame advanced offset' and metadata value for, Dialnorm, DRC and APM .
Track assignment of the audio within the Dolby E stream.
Tape format and Television frame / line rate.
Aspect ratio format including protected area.
The existence and format of closed captions.
The existence and format of any other program associated data.
A technical and quality report.

If the tape has more than one segment/program, then a cue sheet shall be supplied, showing start, end time, and duration of each item. These shall be in time code notation. ie HH:MM:SS.

12.2 The supplier will also include an identification slate prior to the commencement of the program material on the videotape. This shall include at least,

Series Title.
Episode Title
Episode Number
Duration in minutes and seconds

12.3   It is preferred that a round clock, or circle, shall be included with the slate. It shall be the same aspect ratio as the program it precedes. If possible, aspect ratio and audio mode are to be included in the slate information.

12.4   Prior to the start of any program there shall be at least 10 seconds of countdown that goes to black/silence at 2 seconds. It is preferable that program identification is included on this countdown.

*If within the preceding technical requirements, a parameter cannot be met, an exemption will need to be obtained from the Australian Broadcasting Corporation (ABC). This will be by way of formal negotiation, a copy of which shall accompany the program**

13 REFERENCES

This document cites and is in agreement with the following:

- the specifications of recommendation ITU-R BT. 601-5, SMPTE 259M (as revised).
- the specifications of recommendation ITU-R BT. 709-5, SMPTE 292M (as revised).
- the specifications of recommendation SMPTE 320M
- the specifications of recommendation EBU specification Tech.3097 and N12.

14 SAFE AREA DIAGRAMS

Figure 1
SD 16:9 Shoot to Protect 14:9 Title and Action Safe Areas, 625 line
720 pixels x 576 Active Interlaced Lines

14:9 central zone raster edge
Action Safe
4:3 central zone raster edge
Title Safe
Title Safe
Action Safe

Lines f1: 23-310, f2: 336-623
Action Safe: Lines 33-300, 346-613
Title Safe: Lines 38-295, 351-608

15.9% of 16:9 Image (115 pixels)
10% of 16:9 Image (72 pixels)
5%
3.5%

720 pixels
Action Safe: 576 pixels
Title Safe: 490 pixels
4:3 central zone raster edge: 540 pixels
14:9 central zone raster edge: 630 pixels
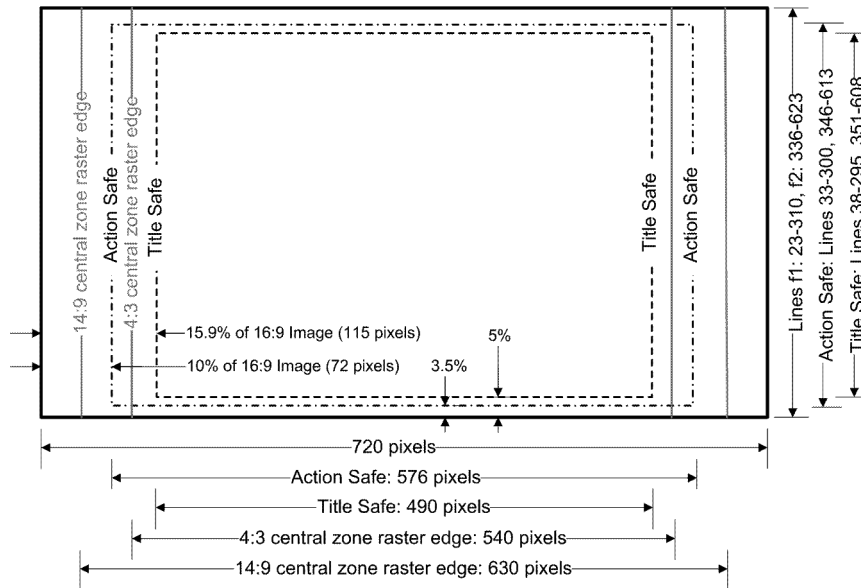
Figure 2
SD 16:9 Shoot to Protect 16:9 Title and Action Safe Areas, 625 line
720 pixels x 576 Active Interlaced Lines

Action Safe
Title Safe
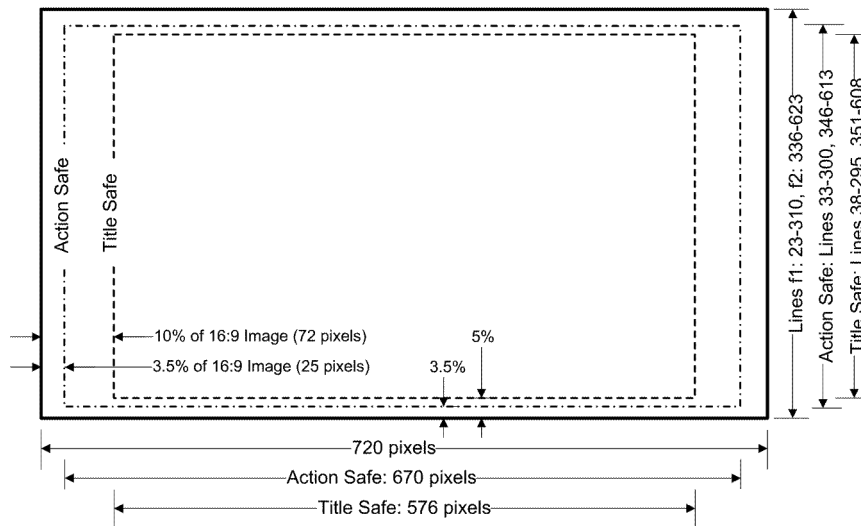
Lines f1: 23-310, f2: 336-623
Action Safe: Lines 33-300, 346-613
Title Safe: Lines 38-295, 351-608

10% of 16:9 Image (72 pixels)
3.5% of 16:9 Image (25 pixels)
5%
3.5%

720 pixels
Action Safe: 670 pixels
Title Safe: 576 pixels

Figure 3
SD 4:3 Title and Action Safe Areas, 625 line
720 pixels x 576 Active Interlaced Lines

Action Safe

Title Safe

11% of 4:3 Image (79 pixels)   10%

6% of 4:3 Image (44 pixels)   5%

Lines f1: 23-310, f2: 336-623

Action Safe: Lines 38-295, 351-608

Title Safe: Lines 52-281, 365-594

720 pixels

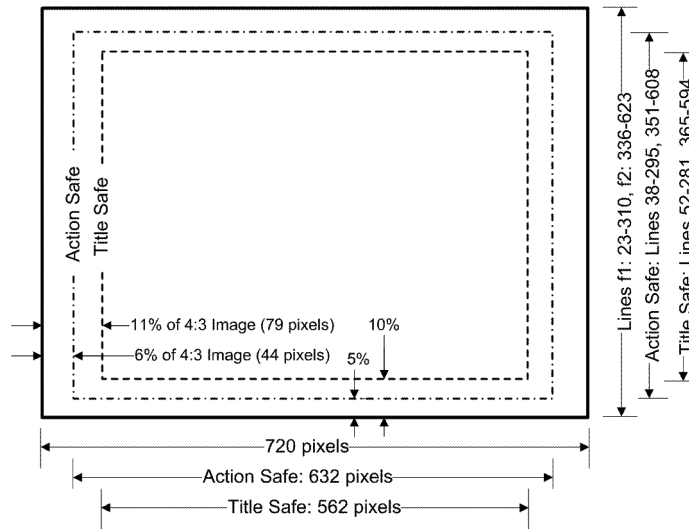Action Safe: 632 pixels

Title Safe: 562 pixels

Figure 4
HD 16:9 Shoot to Protect 14:9 Title and Action Safe Areas, 1080 line
1920 pixels x 1080 Active Lines

14:9 central zone raster edge

Action Safe

4:3 central zone raster edge

Title Safe

Title Safe

Action Safe

15% of 16:9 Image (288 pixels)   5%

10% of 16:9 Image (192 pixels)   3.5%

Lines: 21-560, 584-1123

Action Safe: Lines 40-541, 603-1104

Title Safe: Lines 48-533, 611-1096

1920 pixels

Action Safe: 1536 pixels

Title Safe: 1344 pixels

4:3 central zone raster edge: 1440 pixels

14:9 central zone raster edge: 1680 pixels